Core Review:

1. The reading scores of 4th graders and 7th graders on their respective standardized tests are seen below in the stemplots. The scores are in points out of 50.

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 4th Grade | | | | |  | 7th Grade  **7th grade**:  *n* = 20  *X*min = 1  Q1 = 19  Med = 26  Q3 = 32  *X*max = 36  Mean = 24.09  *s* = 5.83  **4th grade**:  *n* = 19  *X*min = 12  Q1 = 21  Med = 30  Q3 = 35  *X*max = 42  Mean = 26.23  *s* = 4.95 | | | | | |
|  |  |  |  |  | 0 | 1 |  |  |  |  |  |
|  |  |  |  |  | 0 |  |  |  |  |  |  |
|  |  |  |  | 2 | 1 | 2 |  |  |  |  |  |
|  |  |  | 8 | 5 | 1 | 5 | 8 | 8 |  |  |  |
|  |  | 2 | 0 | 0 | 2 | 0 | 3 | 3 | 4 |  |  |
|  | 9 | 8 | 6 | 5 | 2 | 5 | 7 | 8 |  |  |  |
|  |  |  | 2 | 1 | 3 | 0 | 0 | 1 | 3 | 3 | 3 |
| 9 | 7 | 6 | 5 | 5 | 3 | 5 | 6 |  |  |  |  |
|  |  |  | 2 | 0 | 4 |  |  |  |  |  |  |

* 1. Compare and describe the differences between the two groups
  2. Are there any outliers in either distribution?
  3. Assuming the population of 7th grade scores is roughly symmetric and unimodal with the same mean and standard deviation as above, what is the probability that a student scored above a 33 on the reading test?

1. Many drivers of cars that can run on regular gas actually buy premium in the belief that they will get better gas mileage. To test that belief, we use 10 cars in a company fleet in which all the cars run on regular gas. Each car is filled first with either regular or premium gasoline, decided by a coin toss, and the mileage for that tank-full is recorded. Then the mileage is recorded again for the same cars for a tank-full of the other kind of gasoline. We don’t let the drivers know about this experiment. Here are the results in miles per gallon:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Regular** | 16 | 20 | 21 | 22 | 23 | 22 | 27 | 25 | 27 | 28 |
| **Premium** | 19 | 22 | 24 | 24 | 25 | 25 | 26 | 26 | 28 | 32 |

Is there evidence that cars get significantly better fuel economy with premium gasoline? Use 0.01 level of significance and a test.

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|  |  |  |  |  | 0 | 1 |  |  |  |  |  |
|  |  |  |  |  | 0 |  |  |  |  |  |  |
|  |  |  |  | 2 | 1 | 2 |  |  |  |  |  |
|  |  |  | 8 | 5 | 1 | 5 | 8 | 8 |  |  |  |
|  |  | 2 | 0 | 0 | 2 | 0 | 3 | 3 | 4 |  |  |
|  | 9 | 8 | 6 | 5 | 2 | 5 | 7 | 8 |  |  |  |
|  |  |  | 2 | 1 | 3 | 0 | 0 | 1 | 3 | 3 | 3 |
| 9 | 7 | 6 | 5 | 5 | 3 | 5 | 6 |  |  |  |  |
|  |  |  | 2 | 0 | 4 |  |  |  |  |  |  |

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